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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/913,368	12/17/2001	Peter Kenington	46309/262012	9610

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EXAMINER

WARE, CICELY Q

ART UNIT PAPER NUMBER

2634

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

X

Office Action Summary	Application No. 09/913,368	Applicant(s) KENINGTON, PETER	
	Examiner Cicely Ware	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 33-64 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 33-37, 43-46, 51-59, 62 and 64 is/are rejected.
- 7) ☒ Claim(s) 38-42, 47-50, 60, 61 and 63 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to because:

- a.) Examiner suggests applicant label Figure 1 as **"PRIOR ART"**.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. This application has been filed with informal drawings, which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Specification

3. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

4. The disclosure is objected to because of the following informalities:

- a. Applicant has omitted the appropriate heading in the disclosure:

Content of Specification

- (a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive; preferably from two to seven words may not contain more than 500 characters.

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- (b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.
- (c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.
- (d) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.

Or alternatively, Reference to a "Microfiche Appendix": See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.
- (e) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:
 - (1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."
 - (2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."
- (f) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of

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the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

- (g) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.
- (h) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.
- (i) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).
- (j) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application, which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).
- (k) Sequence Listing. See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

b. Pg. 3, line 13, applicant makes reference to a "CW pilot". Examiner suggests applicant spell out all first instances of acronyms.

c. Pg. 3, applicant does not make reference to the following figures in the disclosure (Fig. 4a, 4b, 6a, 6b, 7a, 7b, 9a, 9b). Examiner suggest applicant re-write the Figure references to incorporate all figures.

Appropriate correction is required.

5. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

6. Claim 48 is objected to because of the following informalities:

a. Claim 48, examiner suggests double spacing claim lines. Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

8. Claims 33-36, 44, 51, 52, 57-59 and 62 are rejected under 35 U.S.C. 102(a) as being anticipated by Applicant's Admitted Prior Art (Fig. 1).

(1) With regard to claim 33, Applicant's Admitted Prior Art discloses in (Fig. 1) signal processing apparatus comprising a signal amplifier (102) and a frequency converter (100) which operate in succession on an input signal and a lineariser (104) which is provided between the amplifier and the frequency converter to introduce a correction signal that is adapted to make the overall input and output characteristic of the apparatus more linear by linearising both the amplifier and frequency converter means (Pg. 4, lines 7-16).

(2) With regard to claim 34, claim 34 inherits all the limitations of claim 33. Applicant's Admitted Prior Art further discloses wherein a feedback signal derived from the output of the apparatus is used by the lineariser to adapt the correction signal (Pg. 4, lines 18-20).

(3) With regard to claim 35, claim 35 inherits all the limitations of claim 35. Applicant's Admitted Prior Art further discloses a pilot signal generator for introducing a pilot signal into the input signal prior to frequency conversion and amplification, wherein

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the feedback signal contains distortion components from the pilot signal produced by at least one of the frequency converter and the amplifier (Pg. 4, lines 23-25).

(4) With regard to claim 36, claim 36 inherits all the limitations of claim 35.

Applicant's Admitted Prior Art further discloses wherein the pilot signal is one of a CW carrier signal, a full carrier AM signal, a suppressed carrier AM signal, a single sideband signal, a quadrature amplitude modulated signal, a filter quadrature phase shift keyed signal, a direct sequence spread spectrum signal, and a frequency hopped carrier signal modulated with any of the foregoing kinds of signal (Pg. 4, lines 8-10, 22-23).

(5) With regard to claim 44, claim 44 inherits all the limitations of claim 33.

Applicant's Admitted Prior Art further discloses in (Fig. 1) wherein the lineariser comprises a distortion generator (104) for producing the correction signal from the output signal of whichever of the amplifier (102) and the frequency converter (100) precedes it.

(6) With regard to claim 51, claim 51 inherits all the limitations of claim 33.

Applicant's Admitted Prior Art further discloses in (Fig. 1) wherein the frequency converter (100) comprises a mixer for mixing a mixing signal into a received signal destined to be frequency converted.

(7) With regard to claim 52, claim 52 inherits all the limitations of claim 33.

Applicant's Admitted Prior Art further discloses wherein the frequency converter is an upconverter for converting an intermediate frequency band signal into a radio frequency band signal (Pg. 4, lines 8-12).

(8) With regard to claim 57, claim 57 inherits all the limitations of claim 33.

(9) With regard to claim 58, claim 58 inherits all the limitations of claims 57 and
34.

(10) With regard to claim 59, claim 59 inherits all the limitations of claims 58 and
35.

(11) With regard to claim 62, claim 62 inherits all the limitations of claims 57 and
44.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 37, 45, 56 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (Fig. 1), as applied to claims 33, 35, 44 and 57, in view of McNicol (US Patent 5,770,971) (cited by applicant).

(1) With regard to claim 37, claim 37 inherits all the limitations of claim 35. However Applicant's Admitted Prior Art does not disclose wherein the pilot is one of a two-tone pilot signal and a multi-tone pilot signal.

However McNicol discloses wherein the pilot is one of a two-tone pilot signal and a multi-tone pilot signal (col. 3, lines 34-38, col. 5, lines 53-57).

Therefore it would have been obvious to one of ordinary skill in the art to modify Applicant's Admitted Prior Art in view of McNicol to incorporate wherein the pilot is one

of a two-tone pilot signal and a multi-tone pilot signal in order to reduce intermodulation distortion among the multiple channels (McNicol, col. 3, lines 40-41).

(2) With regard to claim 45, claim 45 inherits all the limitations of claim 44.

McNicol further discloses in (Fig. 1) wherein the distortion generator (42) comprises a non-linearity generator (12, 16) to adaptively control the gain and phase of the compensation signal component in order to reduce the total distortion produced by the system (col. 4, lines 2-7, col. 5, lines 63-66).

(3) With regard to claim 56, claim 56 inherits all the limitations of claim 33.

McNicol further discloses wherein the input signal is a CDMA signal to provide sufficient envelope fluctuation (col. 8, lines 58-63).

(4) With regard to claim 64, claim 64 inherits all the limitations of claims 57 and 56.

11. Claim 43 are rejected under 35 U.S.C. 103(a) as being obvious over Applicant's Admitted Prior Art (Fig. 1) as applied to claim 33, in view of Kenington et al. (US Patent 5,334,946).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject

matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2).

(1) With regard to claim 43, claim 43 inherits all the limitations of claim 33. However Applicant's Admitted Prior Art does not disclose wherein a digital signal processor is used to control the correction signal using feedback from the output of the signal processing apparatus.

However Kenington et al. discloses in (Fig. 2 (17, 40, 18')) wherein a digital signal processor is used to control the correction signal using feedback from the output of the signal processing apparatus (abstract, col. 8, lines 31-35, col. 10, lines 31-32).

Therefore it would have been obvious to one of ordinary skill in the art to modify Applicant's Admitted Prior Art in view of Kenington et al. to incorporate wherein a digital signal processor is used to control the correction signal using feedback from the output of the signal processing apparatus in order to remove distortion and problems that arise from temperature and aging (Kenington et al., col. 8, lines 53-55).

12. Claims 46, 53 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (Fig. 1) in combination with McNicol (5,770,971) (cited by applicant), as applied to claims 45, 52, 54 and 62 and further in view of Faulkner et al. (US Patent 5,420,536).

(1) With regard to claim 46, claim 46 inherits all the limitations of claim 45. Applicant's Admitted Prior Art in combination with McNicol disclose all the limitations of claim 45. However Applicant's Admitted Prior Art in combination with McNicol do not disclose wherein the non-linearity generator uses at least one of anti-parallel diodes, a FET channel, dual gate GaAsFETs operating close to pinch-off, Schottky diodes, mixers and multipliers in the non-linearity generating process.

However Faulkner et al. discloses wherein the non-linearity generator uses at least one of anti-parallel diodes, a FET channel, dual gate GaAsFETs operating close to pinch-off, Schottky diodes, mixers and multipliers in the non-linearity generating process (abstract, col. 2, line 68, col. 3, lines 1-2, col. 4, lines 3-18, col. 5, lines 64-68).

Therefore it would have been obvious to one of ordinary skill in the art to modify the inventions of Applicant's Admitted Prior Art in combination with McNicol in view of Faulkner et al. to incorporate wherein the non-linearity generator uses at least one of anti-parallel diodes, a FET channel, dual gate GaAsFETs operating close to pinch-off, Schottky diodes, mixers and multipliers in the non-linearity generating process for dynamic variation or modulation of an operating point of the RF amplifier, which is the dynamic bias (Faulkner et al., col. 4, lines 3-5).

(2) With regard to claim 53, claim 53 inherits all the limitations of claim 52.

Faulkner et al. further discloses in (Fig. 3) wherein the frequency converter comprises in-phase (17) and quadrature signal (18) paths for handling in-phase and quadrature signals representing a signal at the intermediate frequency band, wherein there is a separate independently controlled, lineariser (19, 20, 21) operating on each of these signal paths to provide excellent reduction in intermodulation distortion and give power added efficiencies.

(3) With regard to claim 55, claim 55 inherits all the limitations of claims 54 and 53.

13. Claim 54 is rejected under 35 U.S.C. 103(a) as being obvious over Applicant's Admitted Prior Art (Fig. 1) as applied to claim 33, in view of Voyce et al. (US Patent 4,929,906).

With regard to claim 54, claim 54 inherits all the limitations of claim 33. However Applicant's Admitted Prior Art does not disclose wherein the frequency converter is a downconverter for converting a radio frequency band signal into an intermediate frequency band signal.

However Voyce et al. discloses in (Fig. 1) wherein the frequency converter is a downconverter (12) for converting a radio frequency band signal into an intermediate frequency band signal (col. 2, lines 43-45, col. 3, lines 16-18).

Therefore it would have been obvious to one of ordinary skill in the art to modify Applicant's Admitted Prior Art in view of Voyce et al. to incorporate wherein the

frequency converter is a downconverter for converting a radio frequency band signal into an intermediate frequency band signal to permit a greater range of choice for implementing a filter so as to maximize the stability and efficiency and minimize the cost of the system (Voyce et al., col. 3, lines 47-54).

Allowable Subject Matter

14. Claims 38-42, 47-50, 60, 61 and 63 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: The instant application discloses a signal processing apparatus. Prior art references show similar methods but fail to teach: **“the pilot is removed from the output of the apparatus by a filter or by the introduction of a pilot cancellation signal”**, as in claim 38; **“the pilot cancellation signal is adjusted using feedback derived from the output of the apparatus”**, as in claim 39; **“the pilot cancellation signal comprises a frequency converted, phase shifted and amplitude adjusted version of the pilot signal”**, as in claim 40; **“a digital processor is used to control the pilot cancellation signal using feedback from the output of the signal processing apparatus”**, as in claim 41; **“a suppressor for canceling signals which are images of the pilot signal”**, as in claim 42; **“the non-linearity generator is arranged to generate the non-linearity by mixing its input signal with itself one or more times to produce the non-linearity”**, as in claim 47; **“the non-linearity generator is arranged to generate a third order**

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non-linearity by mixing the input to the non-linearity generator with itself and then with its input”, as in claim 48; “components of the non-linearity are generated and controlled separately”, as in claim 49; “wherein in-phase and quadrature signals are produced from each separately generated non-linearity component and are controlled separately”, as in claim 50; “the step of removing the pilot signal from the output signal of the method by filtering or by introducing a pilot cancellation signal”, as in claim 60; “the pilot cancellation signal using feedback derived from the output signal of the signal processing method”, as in claim 61; “distortion generation comprises the step of generating and controlling non-linearity components independently”, as in claim 63.

Conclusion

15. The prior art made record and not relied upon is considered pertinent to applicant's disclosure:

a. Atsushi et al. EP 0544117 (cited by applicant) discloses a linear amplifier performing distortion compensation control.

b. Myer US Patent 4,580,105 discloses an automatic reduction of intermodulation products in high power linear amplifiers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cicely Ware whose telephone number is 571-272-3047. The examiner can normally be reached on Monday – Friday, 8-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Cicely Ware

cqw
December 13, 2004


AMANDA L E
PRIMARY EXAMINER